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REMARKS

Applicants appreciate the consideration shown by the Office as evidenced by the Office Action mailed on September 27th, 2006. In that Office Action, the Examiner rejected claims 1-10, 12-24, 26-43, and 45-74. Claims 53-74 have been withdrawn subject to a restriction requirement. In this response, claims 1, 4, 6, 15, 18, and 20 are amended, and claims 3, 17, and 35-74 are canceled. Claims 1, 2, 4-10, 12-16, and 18-34 remain pending in the present patent application. In view of the above amendments and the following remarks, Applicant requests further examination and reconsideration of the present patent application.

Election/Restrictions

Applicants hereby affirm their election of claims 1-10, 12-24, 26-43, and 45-52, for prosecution on the merits. Claims 53-74 have been canceled.

Claim Rejections

Claims 1, 3-10, 13 and 14 were rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue et.al. U.S. Patent number 6,074,497 (Hereafter "Inoue.) Claims 1-10, 13-24, 27-43, and 46-52 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Takada et.al. U.S. Patent Application number 2006/0048866 (Hereafter "Takada".) The applicant respectfully traverses these rejections.

A brief description of some of the embodiments of the present invention might be appropriate. One embodiment relates to a dispersoid-strengthened molybdenum-based nanocomposite that has a high volume fraction of nano particle loading, and is characterized by superior mechanical properties and microstructural stability compared to conventionally used molybdenum alloys.

For example, claim 1 as amended recites an x-ray tube comprising at least one x-ray target substrate, wherein said x-ray target substrate comprises a molybdenum-based nanocomposite, said molybdenum-based nanocomposite comprising:

a) a metallic matrix comprising molybdenum; and

b) a plurality of nanoparticles dispersed throughout said metallic matrix, wherein said plurality of nanoparticles comprises from about 2 volume percent to about 20 volume percent of said molybdenum-based nanocomposite;

wherein each of said plurality of nanoparticles comprises at least one of an inorganic oxide, an inorganic carbide, an inorganic boride, an inorganic oxycarbide, an inorganic oxynitride, an inorganic silicide, an inorganic aluminide, and combinations thereof.

First, the Inoue reference fails to teach, suggest, or disclose the limitation of a molybdenum-based nanocomposite as recited in independent claim 1. Inoue discloses an aluminum-based composite alloy dispersed with hard fine particles or solid-lubricant particles. Molybdenum is used as an additive to facilitate the quasi-crystal formation (Column 3, lines 26-43). The amount of molybdenum is between 1 to about 7 atomic percent. Clearly, these aluminum-based alloys comprising a small amount of molybdenum as additives cannot be considered as molybdenum-based alloys. The molybdenum-based alloy as used in the present disclosure includes elemental molybdenum (as recited in paragraph 22, and example 1) or a molybdenum-based alloy. The term "Molybdenum-based alloy" as used in the art is understood to mean an alloy in which molybdenum is the constituent element having the highest concentration among all elemental constituents in the alloy. The aluminum-based alloys disclosed in Inoue cannot be considered molybdenum-based alloys nor they are equivalent to them in terms of yield strength, creep-resistance, or high temperature thermal stability. Applicant respectfully submits that no proper prima facie case of obviousness has been made out against claim 1 or its dependent claims 3-10, 13 and 14. Reconsideration is respectfully requested.

Claims 1-10, 13-24, 27-43, and 46-52 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Takada. The applicant respectfully traverses these rejections.

Takada describes a nitriding process used to form a dispersion of nanosized nitride particles in a molybdenum-based alloy. The Takada reference fails to teach, suggest, or disclose a nanocomposite in which a plurality of nanoparticles comprises at least one of an inorganic oxide, an inorganic carbide, an inorganic boride, an inorganic oxycarbide, an inorganic oxynitride, an inorganic silicide, an inorganic aluminide, and combinations thereof. In fact, Takada fails to fairly suggest any type of nanoparticle can or should be in the material other than the nitride nanoparticles formed during the nitriding process described by this reference. In this reference, there are two types of reinforcement phases described as present in the material. First, there are carbide, boride, or oxide "particles" that are initially present. Nothing is ever mentioned as to the size of these particles. Second, there are nitride "nanoparticles" present after multi-stage nitriding processes are carried out. The "nanoparticles" are said to have a length of about 50nm and a thickness of about 10 nm. See paragraph [0036].

A clear distinction between these "particles" on the one hand and "nanoparticles" on the other is set forth in Takada, in that the oxide, carbide, and/or boride phases are NEVER referred to as nanoparticles, whereas, in the same context and description, the nitride phase is exclusively referred to as "nanoparticles." See, for example, Figure 1 and paragraphs [0024]. Moreover, the description in Takada indicates that the non-nitride particles are of a larger size scale than the nitride nanoparticles. It is significant to note that in Takada, recrystallization is inhibited only by the nitride nanoparticles and not by the other particles. See paragraph [0031], last sentence. This indicates that only the nitride particles are sufficiently small to pin grain

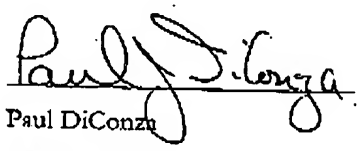
boundaries. Regions of the material that remain free of nitride nanoparticles (but presumably contain the other particles) do recrystallize. See paragraph [0033]. From this it is clear that Takada's method is restricted to the formation of nanoparticles consisting exclusively of nitrides, formed during the multi-stage nitriding process taught by this reference.

As Takada fails to teach, suggest, or disclose a material that contains nanoparticles other than nitrides formed during a reactive nitriding process, Applicants respectfully submit that amended independent claims 1 and 15, along with their respective dependent claims, are allowable over this applied reference. Reconsideration is respectfully requested.

Conclusion

In view of the remarks and amendments set forth above, Applicant respectfully requests allowance of the pending claims. If the Examiner believes that a telephonic interview will help speed this application toward issuance, the Examiner is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,



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Friday, December 22, 2006